Claims

1. Resonator operating with bulk acoustic waves, having a layer sequence, containing:

- a lower layer region, which comprises a first electrode,
- an upper layer region, which comprises a second electrode,
- a piezoelectric layer, which is arranged between the first and second electrode,
- wherein a capacitor is connected in parallel or in series with said resonator.

2. Resonator as recited in claim 1, which is arranged on a carrier substrate.

3. Resonator as recited in claim 1 or 2, in which the upper and lower layer region each consists of one layer or a plurality of layers.

4. Resonator as recited in at least one of claims 1 to 3, in which the first and/or the second electrode consists of a plurality of layers, which are made of at least two different materials.

5. Resonator as recited in at least one of claims 1 to 4, in which an acoustic mirror is realized in the upper and/or in the lower layer region, said mirror comprising at least two alternating layers having different acoustic impedance.

6. Resonator as recited in claim 5, in which one of the layers of the acoustic mirror is one of said electrodes.

7. Resonator as recited in at least one of claims 1 to 6, which is arranged over an air gap provided in the carrier substrate.

8. Filter, having a ladder-type arrangement, a lattice-type arrangement or a stacked crystal filter arrangement, which contains at least one resonator as recited in at least one of claims 1 to 7 in a serial branch and/or a parallel branch.

9. Filter as recited in claim 8, in which a capacitor is connected in parallel or in series, respectively, only to the respective resonators in the serial branches or only to the respective resonators in the parallel branches, which reduces the coupling of the corresponding resonators.

10. Duplexer, containing at least one filter as recited in claim 8 or 9.

11. Electrical circuit containing:

a resonator stack that comprises at least two resonators arranged on top of one another and operating with bulk acoustic waves, and

at least one additional resonator or resonator stack,

wherein each of said resonators operating with bulk acoustic waves contains a lower electrode, an upper electrode and a piezoelectric layer arranged between the two,

wherein the upper electrode of the lower resonator operating with bulk acoustic waves and the lower electrode of the upper resonator operating with bulk acoustic waves, which are arranged on top of one another in the resonator stack, is electrically connected with one of the electrodes of at least one additional resonator or resonator stack.

12. Circuit as recited in claim 11, in which the second electrode of the at least one additional resonator is connected to ground.

13. Circuit as recited in claim 11 or 12, in which a coupling layer is provided between the upper electrode of the lower resonator operating with bulk acoustic waves and the lower electrode of the upper resonator operating with bulk acoustic waves, which are arranged in the resonator stack.

14. Circuit as recited in one of claims 11 to 13, in which the at least one additional resonator is a resonator operating with bulk acoustic waves, a resonator operating with acoustic surface waves, an LC resonator or a resonator stack that comprises at least two resonators arranged on top of one another operating with bulk acoustic waves.